GE
Grid Solutions

LogicLinx on a Multilin G500 Gateway Device

Quick Start Guide

LogicLinx* is an automation tool that enables you to create applications that have traditionally been too costly or difficult to implement – without the need for hardwiring. Using any or all the IEC® 61131-3 programming languages, you can create automation routines that run on your Multilin G500 gateway device.

Prerequisites

Before you can configure LogicLinx on your Multilin G500 gateway device, the following components must be present:

- A G500 gateway device connected to the configuration computer through a serial or Ethernet connection.
- SGConfig™ V7.3 or higher with LogicLinx Wizard add-in installed on the configuration computer (SGConfig 8.5 or higher for the 32-bit version of the LogicLinx editor).
- LogicLinx editor installed on the configuration computer.

Differences between the 16-bit and the 32-bit versions of the LogicLinx editor

- The 16-bit version only runs on 32-bit versions of the Windows operating system while the 32-bit version runs on both 32-bit and 64-bit versions of the Windows operating system.
- The 16-bit version requires users to run as administrators while the 32-bit version does not have this constraint.
- The 32-bit version allows users to compare LogicLinx programs in two different devices.
- Instruction language (IL) programs cannot be created or modified in the 32-bit version. Existing programs can be compiled and modified using a text editor.
- Function chart (FC) programs cannot be created or modified in 32-bit version. Existing programs can be compiled.
- Most programs created and modified in the 32-bit version can be opened in the 16-bit version provided they do not exceed the maximums for names, descriptions and other artefacts of the 16-bit version.
- The user-interface in the 32-bit version is based on Visual Studio. Most of the functions previously available through the toolbar and menus in the 16-bit version are now available using a combination of the Solution Explorer and Properties windows of the 32-bit version.
- The Dictionary in the 16-bit version is now called Global Variables in the 32-bit version.
- Compile and Make operations in the 16-bit version are called Build in the 32-bit version.
- To set the target in the 32-bit version, you need to click on the drop-down in the Solution Explorer.
- To do simulation in the 32-bit version, you need to explicitly select the Simulate target for a program, build it and then switch to Online mode
- You need to choose 'Online' mode to start real-time debugging in the 32-bit version.

To configure LogicLinx on your G500 gateway device:

Before LogicLinx can run on your G500 gateway device, you must configure the automation application.

1. Launch SGConfig™ and open a project containing the G500 gateway device you want to configure LogicLinx on.
2. Select the G500 gateway device.

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3. On the **Configure** tab, click **Wizard**.

4. On the welcome page of the wizard, click **Next**.

5. On the **Select Task** page of the wizard, select **Proceed to Configuration** and click **Next**.

6. On the **Connection** page of the wizard, select either Serial Port or Ethernet as the connection type to your G500 gateway device. If Ethernet is selected, Secure Debugger option can be checked if secure connection is required between debugger and G500 gateway device. Based on the option you chose, configure the connection parameters and click **Next**.

    NOTICE The Secure Debugger connection is only made available for users of the following groups: Admin and Supervisor.

7. On the **Define Owned Points** page of the wizard, create your LogicLinx-owned points. For information on owned points, refer to *Owned and Mapped Points* below.

    » To create owned points:
    a) A tab is shown for each point type. Within each tab, click the **Add Point** button to insert a new row in the list.
    b) Click the cells in the new row to modify the default values.
    c) Once you have finished creating your LogicLinx owned points, click **Next**.

8. On the **Define Mapped Points** page of the wizard, select the G500 gateway device database points you want to give LogicLinx access to. For information on mapped points, refer to ***Owned and Mapped Points*** below.

    » To map points:
    a) All available points within the G500 gateway device are shown as a tree list. Click the **+** next to each entry to expand the list and view the points contained within.
    b) To select a point, select the checkbox in the **Map?** field. The point will be added to the **Mapped Points**.
    c) On the **Mapped Points** screen, you can review the selected points and modify the LogicLinx tag name from the default value.
        Tip: Internal transition counters can be added to digital input points. For more information, refer to *Internal Transition Counters* below.
    d) Mapped points shown with a red background have been invalidly mapped; these points do not exist within the Gateway device system point database. This can cause errors when running LogicLinx programs. To correct this, select the row and click **Delete invalid mapping**.
    e) Once you have finished mapping points from the Gateway device, click **Next**.

9. The LogicLinx editor is shown on the next page of the wizard. You can create and save your LogicLinx automation programs at this time. Once finished, click **Next**.

    To allow your LogicLinx programs to execute on the G500 gateway device, you must ensure that the **target** setting is correctly configured.

    » To ensure that the target setting is correctly configured:
    a) On the toolbar, select **Make** > **Compiler Options**.
    b) On the **Compiler Options** window, highlight *ISA86M: TIC code for Intel* and click **Select**. Once an arrow is added next to *ISA86M: TIC code for Intel*, click **OK**.
    c) On the program window, click **Make** > **Make Application**. The program is compiled.

10. On the completion page, click either:
    • **Exit & Save Changes** to save the configuration, or
    • **Exit & Discard Changes** to ignore the configuration.

11. Select the G500 gateway device. On the **Configure** tab, click **Sync To Device** to upload the configuration to your G500 gateway device. Once the synchronization is complete, the G500 gateway device restarts and loads LogicLinx.

Note: If the point mappings on your G500 gateway device are modified through the Online Configuration Tool after you have uploaded your configuration, you must synchronize the updated G500 gateway device configuration within SGConfig to ensure that your LogicLinx mappings are still valid. To do this, select your G500 gateway device and click **Sync From Device** on the **Configure** tab. Once the synchronization is complete, click **Validate**. If any errors are reported, correct them by repeating the steps above.

Owned and Mapped Points

LogicLinx-owned points provide an interface between LogicLinx and other c device applications. From LogicLinx's perspective, the direction of these owned points is reversed compared to other mapped system points. Owned *input* points can be written to by LogicLinx to provide data to other applications. Owned *output* points can be used by external applications to send data into LogicLinx, allowing LogicLinx programs to read these values. LogicLinx documentation refers to these reverse-direction points as "conversion points".

Mapped points are those that are owned by applications external to LogicLinx. All system points in the G500 gateway device are available as mapped points, including LogicLinx-owned points. Each system point is assigned a unique tag name, with which the point is referenced as a LogicLinx variable in the Editor.

Internal Transition Counters

Since LogicLinx works on a cyclical basis, it may miss state changes on digital inputs that occur between input refresh cycles. To account for this, LogicLinx allows you to enable internal transition counters on digital inputs. The input point is monitored for changes between cycles and if a state change is detected, the associated internal transition counter is incremented. The internal transition counter variable reports the total number of state changes that occurred on the associated digital input during the previous cycle.

To add an internal transition counter to a digital input point, select the point and click **Add Internal Transition Counter**. A sub-row is added containing the default tag name for the counter.

Frequently Asked Questions

Q: Does LogicLinx on the G500 gateway device support files (that is, F_ROPEN, FX_READ, F_CLOSE, etc.)? If so, what paths do I have access to?

A: Yes, currently, all files and paths are available. Files can be stored in **`/tmp`** if they are small and do not need to be retained across a reboot. Otherwise, you may use **`/mnt/datalog`**, which is the largest partition on the user CompactFlash card.

Q: Does LogicLinx on the G500 gateway device support initial values (storage of values similar to the D20*/D200*)?

A: Yes, initial and stored values for AOs and DOs are supported as on the D20/D200.

Q: Does LogicLinx on the G500 gateway device support the OPERATE function (similar to the D20/D200)?

A: Yes, the OPERATE function is the same as on the D20/D200.

Q: Does LogicLinx on the G500 gateway device support multiple targets on a single G500 gateway device?

A: No, only one target is currently supported on the G500 gateway device.

Q: Does the G500 gateway device support a "Communications Watchdog" feature (similar to the D20/D200)?

A: The G500 gateway device supports watchdog-style monitoring via two methods:

- Every client application provides a digital input for every device that indicates when that device is online. There are also other points such as transaction counts and failure counts that can be used.

- The Calculator on the G500 gateway device allows you to create digital inputs that reflect a selected quality flag from a specific point, allowing you to monitor offline, loss of communications, scan inhibit, or any other quality flag that is reported. These points do not go offline when the point does, as other expressions would do.

By using these methods, you can monitor the health of an entire device (useful to reduce the number of pseudo points and the number of logic elements in a program) or to monitor selected points individually (separates the points from the device but requires more pseudo points). The first option is preferred when you have many points to monitor, while the second option allows for more granularity and is suggested for small numbers of points. You may also combine the two options by using Calculator to monitor the quality of a single representative point from a device.

Additional Documents

For further information about LogicLinx and the G500 gateway device, refer to the following documents:

- *LogicLinx IEC 61131-3 Soft Logic Getting Started* (SWM0018)
- *LogicLinx IEC 61131-3 Soft Logic User's Guide* (SWM0019)
- *G500 Substation Gateway - Instruction Manual (994-0152)*

Product Support

If you need help with any aspect of your GE Grid Solutions product, you can:

- Access the GE Grid Solutions Web site
- Search the GE Grid Solutions Technical Support library
- Contact GE Grid Solutions Technical Support

GE Grid Solutions Web Site

The GE Grid Solutions Web site provides fast access to technical information, such as manuals, release notes and knowledge base topics.   Visit us on the Web at: http://www.gegridsolutions.com

GE Grid Solutions Technical Support Library

This site serves as a document repository for post-sales requests. To *get* access to the Technical Support Web site, go to: http://sc.ge.com/*SASTechSupport

Contact GE Grid Solutions Technical Support

GE Grid Solutions Technical Support is open 24 hours a day, seven days a week for you to talk directly to a GE representative.

In the U.S. and Canada, call toll-free: 1 800 547 8629.

International customers call: +1 905 927 7070

Or send an e-mail to: multilin.tech@ge.com

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